What is claimed is ;

1. A functional roll film comprising;

a plastic film which is transparent and having gas barrier properties, and provided at its at least one surface with an inorganic oxide layer, and which is wound like roll;

wherein

a maximum thickness of said inorganic oxide layer is 1.5 times or less of a minimum thickness.

2. A functional roll film according to claim 1, wherein

said inorganic oxide layer comprises a composite oxide matter in which at least two or more kinds of oxide matters are composite, and a difference between a maximum value and a minimum value of a composition of one component of said composite oxide matter is within 20 wt%.

3. A functional roll film according to claim 1, wherein

static electricity of said plastic film having said inorganic oxide layer is in a range from -10 kV to +10 kV.

4. A functional roll film according to claim 3, wherein

a variation in thickness of said inorganic oxide layer formed on said plastic film is in a range of ±20%.

5. A vacuum evaporation apparatus comprising:

a vacuum chamber in which a long plastic film moves;

material holding means having a thin partitioning portion to partition an evaporation material for holding said evaporation material; and

heating means which is an electron beam gun for heating and evaporating said evaporation material;

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wherein

said partitioning portion is disposed such as to be inclined through substantially the same angle as an angle of incidence of electron beam irradiated from said electron beam gun.

6. A vacuum evaporation apparatus according to claim 5, wherein

said material holding means is capable of moving in an incident direction of said electron beam or the opposite direction while keeping a parallel relation with respect to a surface of said plastic film onto which said evaporation material is evaporated.

7. A vacuum evaporation apparatus according to claim 5, further comprising on-line measuring means, wherein

X-ray irradiation means irradiates X-rays to said plastic film which moves in said vacuum chamber and on which an evaporation material is evaporated by said electron beam gun and an inorganic oxide layer is formed, characteristic X-ray measuring means measure characteristic X-ray intensity which is excited by the irradiation, and said on-line measuring means outputs a thickness or thickness and composition ratio of said inorganic oxide layer.

8. A vacuum evaporation apparatus according to claim 7, further comprising:

evaporation distribution estimating means for estimating evaporation amount distribution for each of partitioned materials in said material holding means based on data of said measured thickness, or said thickness and said composition ratio of said inorganic oxide layer;

first control amount computing means for calculating an energy amount for each of said materials based on a relational equation between a deviation amount of a preset evaporation amount distribution reference value for each of said materials partitioned in said material holding means and said estimated evaporation distribution, said preset

energy amount for each of said materials partitioned in said material holding means and an evaporation rate, and for determining an output power of said electron beam gun from a total sum of said calculated energy amount for each of said materials;

second control amount computing means for determining an electron beam irradiation time for each of said materials partitioned in said material holding means based on a ratio of said calculated energy amount; and

electron beam gun control means for controlling a heating operation by said electron beam gun based on computed results by said first and second control amount computing means.

9. A vacuum evaporation apparatus comprising:

a vacuum chamber in which a long plastic film moves;

material holding means for holding said evaporation material;

heating means for heating and evaporating said evaporation material so that said evaporation material is evaporated onto said plastic film; and

on-line measuring means;

wherein

X-ray irradiation means irradiates X-rays to said plastic film which moves in said vacuum chamber and on which an evaporation material is evaporated by said heating means and an inorganic oxide layer is formed, characteristic X-ray measuring means measure characteristic X-ray intensity which is excited by the irradiation, and said on-line measuring means outputs a thickness or thickness and composition ratio of said inorganic oxide layer,

said on-line measuring means has:

standard plate moving means for moving a standard plate including a plurality of standard samples having known characteristics into and out from an irradiation light path

of said X-ray;

correcting means characteristic X-ray intensity measured by said characteristic X-ray measuring means based on a measured value of said characteristic X-ray intensity obtained from said standard sample; and

thickness outputting means for outputting thickness or thickness and composition ratio of said inorganic oxide layer based on the corrected characteristic X-ray intensity.

10. A vacuum evaporation apparatus according to claim 9, wherein

said on-line measuring means has

a holding mechanism for keeping, at a constant value, a distance between said characteristic X-ray measuring means and an irradiation position on said plastic film on which said inorganic oxide layer to be irradiated by said characteristic X-ray irradiating means;

distance measuring means for measuring a distance between said characteristic X-ray measuring means and said irradiation position on said plastic film; and

correcting means for correcting characteristic X-ray intensity measured by said characteristic X-ray measuring means based on a measured result by said distance measuring means.

11. A vacuum evaporation apparatus according to claim 9, wherein

said on-line measuring means has opening/closing control means for opening or closing an opening/closing apparatus, thereby controlling whether a thin film is formed or not formed onto said plastic film, measured data when said thin film is formed and when said thin film is not formed are compared with each other, thereby correcting the characteristic X-ray intensity measured by said characteristic X-ray measuring means.

12. A vacuum evaporation apparatus according to claim 9, wherein

said on-line measuring means includes the same number of said characteristic X-ray measuring means as components which constitute said inorganic oxide layer.

13. A vacuum evaporation apparatus according to claim 12, wherein

a characteristic X-ray measuring device constituting said characteristic X-ray measuring means is a proportional counter or a semiconductor detector.

14. A vacuum evaporation apparatus according to claim 9, wherein

said characteristic X-ray measuring means is disposed such that a length of said characteristic X-ray measuring means becomes 100 mm or longer and 500 mm or shorter in a TD (transverse direction) of said plastic film and such that a distance between an evaporation position of said plastic film and said evaporation material held by said material holding means becomes 250 mm or longer.

15. A vacuum evaporation apparatus according to claim 9, wherein

said heating means is an electron beam gun, said electron beam gun being capable of changing output power of said electron beam gun, a scanning pattern of electron beam and a scanning time of electron beam during evaporation; and

said vacuum evaporation apparatus further includes control means for automatically controlling said electron beam gun based on output measured data by said on-line measuring means.

16. A vacuum evaporation apparatus according to claim 9, wherein

said on-line measuring means includes control means for controlling a speed of the moving plastic film based on measured thickness data.

17. A vacuum evaporation apparatus according to claim 9, wherein

said on-line measuring means includes temperature measuring means for measuring an atmosphere temperature in the vicinity of said characteristic X-ray measuring means, and said correcting means corrects the intensity of characteristic X-ray

measured by said characteristic X-ray measuring means based on a measured value of the characteristic X-ray intensity obtained from said standard sample and a temperature obtained by said temperature measuring means.

18. A vacuum evaporation apparatus according to claim 9, wherein

said material holding means has a thin partitioning portion to partition said evaporation material for holding said evaporation material; and

said partitioning portion is disposed such as to be inclined through substantially the same angle as an angle of incidence of electron beam irradiated from said electron beam gun.

19. A vacuum evaporation apparatus according to claim 10, wherein

said on-line measuring means has opening/closing control means for opening or closing an opening/closing apparatus, thereby controlling whether a thin film is formed or not formed onto said plastic film, measured data when said thin film is formed and when said thin film is not formed are compared with each other, thereby correcting the characteristic X-ray intensity measured by said characteristic X-ray measuring means,

said on-line measuring means has the same number of said characteristic X-ray measuring means as components which constitute said inorganic oxide layer,

said characteristic X-ray measuring means is disposed such that a length of said characteristic X-ray measuring means becomes 100 mm or longer and 500 mm or shorter in a widthwise direction of said plastic film and such that a distance between said plastic film and said material holding means holding said evaporation material becomes 250 mm or longer, and

said heating means is an electron beam gun, said electron beam gun being capable of changing output power of said electron beam gun, a scanning pattern of electron beam and a scanning time of electron beam during evaporation.